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Society Management App With Live CCTV Monitoring And Threat Detection

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Abstract: This conceptualized app in society management combines live CCTV surveillance and robust threat detection for enhanced security and efficiency in community administration. The application thus offers society administrators and residents an opportunity for real-time video feeds from surveillance cameras on premise to maintain vigilance. It has features such as AI-based threat detection, which can utilize computer vision techniques such as object detection and motion tracking to identify potential security threats, such as unauthorized access, anomalous motion or dangerous objects such as weapons for example. Apart from this, the application also supports alerting messages, as well as notifications and emergency alerts for more effective management of residents for a safer and more organized stay. All these aspects put together serve as a holistic solution for modern residential communities.

Index Terms **– Society Management, Threat Detection, CCTV Monitoring, Event Booking**

I. INTRODUCTION

Today, as more people live in cities and population densities rise, the need for better residential security is changing. Traditional security methods, like static cameras and manual checks, are not effective in quickly identifying or responding to threats, risking residents' safety. This has led to the development of advanced technology-based solutions for residential security, especially in housing management. AI and deep learning are being integrated into security systems to tackle these issues. AI-driven monitoring uses advanced pattern recognition and image processing to detect threats with minimal human involvement. Deep learning models like YOLOv8 excel at real-time object detection, making them suitable for identifying various threats. In the proposed "Housing Management System," YOLOv8 will be integrated into a mobile app designed with Flutter. This system will monitor video feeds from security cameras for dangers like fire, fights, or robbery. When a threat is identified, alerts will be sent to housing society managers for quick action. The paper also reviews literature and technology related to deep learning in housing security, discussing the strengths and challenges of AI applications, including processing power and privacy concerns. Overall, it aims to show how deep learning can transform traditional security into proactive solutions and improve living conditions in communities.

II. MOTIVATION

Society Management System with Live CCTV Surveillance and Threat Identification meets the increased demand for robust security, incident management, and real-time threat identification in housing societies. The conventional surveillance approaches are not strong enough, making AI-based threat identification a necessary tool for anticipatory security.

Key motivating factors include:

Improved Security: AI-monitored surveillance identifies threats in real-time, warding off security breaches.

Instant Alerts: Quick response to threats such as fire or intrusion is made possible through automated notifications.

Crime Prevention: Smarter surveillance dissuades criminal activities such as theft, tampering, and trespassing**.**

Community Trust: Residents are safer, building trust in security provisions.

Incident Documentation: Footage from recordings helps in investigations and resolution of conflicts.

Cost-Effective: AI minimizes the use of manual security, reducing operating expenses.

Transparency: Automated monitoring provides equitable and impartial security management.

III. LITERATURE SURVEY

3.1. Paper Name: Deep Learning Based Multi Pose Human Face Matching System

Author Name: Muhammad Sohail1, Ijaz Ali Shoukat

Abstract: Current techniques for multi-pose human face matching yield suboptimal out- comes because of the intricate nature of pose equalization and face rotation. Deep learning models, such as YOLO-V5, etc., that have been proposed to tackle these complexities, suffer from slow frame matching speeds and therefore exhibit low face recognition accuracy. Concerning this, certain literature investigated multi-pose human face detection systems; however, those the studies are of elementary level and do not adequately analyze the utility of those systems. up to 80.

3.2. Paper Name: Society Management App

Author Name: Amit Manna, Sarvesh Washindkar, Nishil Rathod

Abstract: This The Daily life in city areas has important things to deal with housing society management. Our day to day needs such as Water supply, Electricity, Security and many more things which directly or indirectly play a vital role in residential life, comes under Housing Society Management. In most of the cases, Society management practices a traditional way of communication. This certainly has some limitations and disadvantages. Daily notices, monthly meetings, cultural events, miscellaneous contacts for daily needs, security alerts, high priority communication and many others which may not be conveyed properly in the current scenario as most of the things are getting handled manually.

3.3. Paper Name: Deep Learning-Based YOLO Models for the Detection of People With Disabilities

Author Name: Madallah Alruwaili, Muhammadnoumanatta

Abstract: This The current methods, while in use, continue to grapple with accuracy and effectiveness concerns. It is imperative to establish dependable solutions capable of distinguishing and categorizing people according to their assistive devices to tackle these issues. People with disabilities, such as those experiencing paralysis, limb deficiencies, or amputations, may encounter issues related to discrimination

and inadequate support. Hence, this research was undertaken to detect and track people with conditions like paralysis, limb deficiency (Amelia), or amputation among the differently-abled population. Modern deep learning models, including YOLO (You Only Look Once) and its variations, have gained substantial acceptance in current applications owing to their distinctive architectural designs.

3.4. Paper Name: DET: Depth Enhanced Tracker to mitigate server occlusion and Homogenous Appearance Problems for Indoor Multiple Object Tracking

Author Name: Cheng-jen Liu and Tsung-nanlin

Abstract: Multiple-object tracking has long been a topic of interest since it plays an important role in many computer vision applications. Existing works are mostly designed for outdoor tracking, such as video surveillance and autonomous driving. However, the behaviors of objects in outdoor tracking scenarios do not fully react the tracking challenges in indoor tracking environments.

3.5. Paper Name: AN Efficient Attention Based Strategy for Anamoly Detection in Surveillance Video

Author Name: Sareer Ul Amin, Yongjun Kim

Abstract: In the present technological world, surveillance cameras generate an immense amount of video data from various sources, making its scrutiny tough for computer vision specialists. In this article, we introduce an efficient Attention-based deep-learning approach for anomaly detection in surveillance video (ADSV). At the input of the ADSV, a shots boundary detection technique is used to segment prominent frames. Next, The Light weight Convolution Neural Network (LWCNN) model receives the segmented frames to extract spatial and temporal information from the intermediate layer. Following that, spatial and temporal features are learned using Long Short-Term Memory (LSTM) cells and Attention Network from a series of frames for each anomalous activity in a sample. To detect motion and action, the LWCNN received chronologically sorted frames.

3.6. Paper Name: Anamoly Detection in Surveillance Videos: A thematic taxanomy of deep models, review and Performance analysis

Author Name: S. Chandrakala · K. Deepak · G. Revathy

Abstract: The task of anomaly detection has recently gained much attention in the field of visual surveillance. Video surveillance data is often available in large quantities, but manual annotation of activities in video segments is tedious. Anomaly detection plays a crucial role in various indoor and outdoor surveillance applications. Video anomaly detection is highly challenging and provides a lot of scope and demand for improving detection performance in real-time scenarios. Recently, deep learning-based approaches are promising to detect

IV. LITERATURE REVIEW

Reference No.	Methodology	Algorithm Used	Limitations
1.	This paper involves developing a real-time face matching algorithm based on YOLO-V5 that utilizes multi-pose human patterns and considers various face orientations to enhance recognition accuracy	YOLO Models Python and Google Collab	Class imbalance Small Object Detection
2.	Involves developing a web-based management system to streamline housing society operations.	Android studio, Firebase QR Code Technology	Data Privacy Concerns, Dependence on Technology
3.	YOLO deep learning models to detect and track individuals with disabilities	YOLO	Accuracy Concerns and Computational Demands.
4.	Developing multi-object tracking (MOT) algorithms tailored for indoor environments to address challenges such as occlusion and limited field of view.	Depth Estimation, Motion Estimation	The method's Limitations are Crowded Scene Handling Occlusion and Similar Appearance
5.	Attention-based deep learning approach for anomaly detection in surveillance videos, utilizing a lightweight Convolutional Neural Network to extract spatial and temporal features	LWCNN, LSTM, Attention Network	Computational Complexity, Data Quality and Quantity, Generalization.
6.	Involves employing deep learning-based approaches to detect anomalies in video surveillance by analyzing spatiotemporal features.	Deep Learning Models (AN, LSTM), One-Class SVMs	Many models trained on specific datasets may not generalize well to new environments making them less adaptable in real-world applications.
7.	Semantic Segmentation Based Crowd Tracking and Anomaly Detection via Neuro-fuzzy Classifier in Smart Surveillance System	Frontend and Backend Technologies, API's and Services	Complexity of Implementation, Cross-Platform Compatibility
8.	Development of a Real-Time Video-Based Threat Detection System using Convolutional Neural Network.	ESP-32CAM module, Convolutional Neural Network	Limited Detection Range, Restricted Object Classes.

V. METHODOLOGY

5.1 System Plan

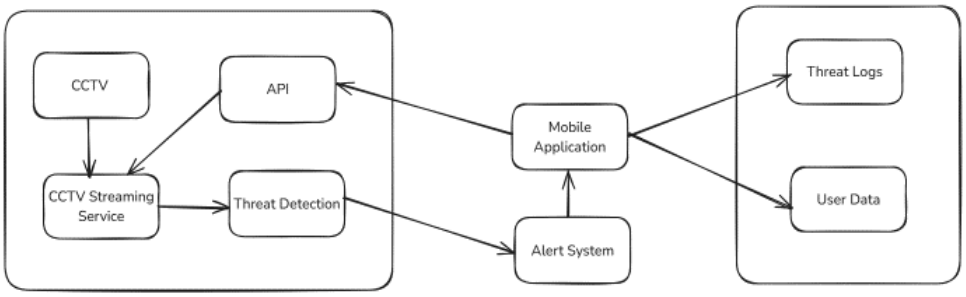

Fig.1. Architecture

The Housing Society Management App with Live CCTV Monitoring and Threat Detection combines different elements to improve security and society management. The methodology describes the system architecture and functionality.

1.User (Residents/Society Admin/Security Personnel):

The process starts with users accessing the Flutter application. Residents can handle visitor entries, report security issues, and receive notifications, whereas society admins and security staff view live CCTV streams and control access.

2.Flutter Mobile Application:

The Flutter application is the main interface for users, through which users can see live CCTV feeds, get real-time alerts on recognized threats, and utilize society management capabilities such as visitor tracking and emergency alerts.

3.Live CCTV Observation & YOLOv8-Based Threat Identification:

The system automatically scans real-time CCTV feeds based on the YOLOv8 model and identifies threats like fire, intrusion, or violence. When it identifies a threat, it sends an alert to inform security guards and residents immediately

4.AI-Powered Threat Detection & Alert System:

The YOLOv8 model analyzes CCTV feeds in real-time, detecting threats with high accuracy. The moment a threat is identified, automated notifications are sent through push notifications on the Flutter app for quick response.

5.Backend Database:

Data, such as user information, visitor logs, and detected threats, are stored securely in Firebase. This provides real-time data synchronization, simple access to historical logs, and a scalable design for future growth

VI. .EXPECTED OUTCOME

The Live CCTV Monitoring and Threat Detection Society Management System is anticipated to improve security, enhance community management, and provide a smooth user experience. By combining real-time CCTV monitoring with AI-based threat detection, the system will ensure round-the-clock surveillance and automatic detection of possible threats like fire, fights, and intrusions. This proactive system will allow for

instant alerts and notifications, ensuring prompt responses from security personnel and residents to effectively counter risks.

Along with the security features, the system will simplify community administration by providing permission-based entry management, visitor logging, and an emergency notification system. Security managers and residents will have the capability to control access permissions, record visitor details, and broadcast critical messages during an emergency, providing a secure and more streamlined living space.

Privacy and data protection are core concerns of the system, with secure access control mechanisms blocking unnecessary use. End-to-end encryption will safeguard all sensitive information, and adherence to data retention policies will maintain user confidentiality and meet legal requirements. All these will instill confidence in residents that their data is secure.

The mobile application will feature an intuitive user interface for easy navigation by both technical and non-technical users. It will include customizable alerts, enabling residents to customize notifications as per their security requirements. The system will be available on the mobile platform, with remote monitoring and control for greater convenience.

Scalability will be an integral part of the system, making it expandable and compatible with future technologies. The system will have third-party API compatibility, making it easy to integrate with smart home systems, IoT devices, or other security tools. Its adaptable architecture will enable it to be easily modified to suit different residential societies, meeting their specific security requirements.

In total, the system's aim is to come up with a secure, scalable, and intelligent security solution that maximizes safety, convenience, and community management. By using AI-powered monitoring and automation, the system intends to optimize conventional security measures into a proactive and effective method, promoting a safer and smarter living experience for all residents

VII. PROPOSED WORK

The intended work is centered on creating a Flutter-based Society Management Application with Live CCTV Monitoring and AI Threat Detection to provide increased residential security. The system utilizes YOLOv8 for real-time threat detection and Firebase for backend management, including user authentication, data storage, and real-time alert notifications. When a threat is identified, the system provides immediate alerts to society administrators and security personnel through the Flutter app, allowing for a prompt response. It also has visitor tracking, access control, and emergency alert functionalities, making it a safe and well-governed community space.

VIII. CONCLUSION

The Society Management Application with real-time CCTV monitoring and threat detection is a very apt solution to enhance the security of a residential society. Combining the IoT-based real-time CCTV with the advanced YOLOv8 deep learning algorithm for threat detection enhances surveillance and identifies threats in advance, particularly in potential fire, violence, robbery, or unwanted entry. This system offers point-of-sale notifications directly to society administrators via the Flutter app, hence being in a position to act on possible threats timely. Therefore, it has something to contend with, merging the best of cutting-edge technology and functional security protocols to reassure residents and

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